ABSTRACT OF THE DISCLOSURE

The invention provides a high hard, strength and tough nano-crystal metal bulk material and a preparation process thereof. The metal bulk material comprises an aggregate of metal nano-crystal grains, wherein an oxide, nitride, carbide, boride or the like of a metal or semimetal exists as a crystal grain growth inhibitor between and/or in the nano-crystal grains.

The respective fine powders of nano-metal bulk material-forming components are mechanically alloyed (MA), using a ball mill or the like, thereby preparing nano-metal powders. Then, hot forming-by-sintering treatment such as spark plasma sintering, extrusion and rolling or explosive forming is applied to the powders to obtain a high hard, strength and tough nano-crystal metal bulk material.